

EXECUTIVE SUMMARY

There were three objectives incorporated into the investigation of contamination associated with the Cornell-Dubilier Electronics site in South Plainfield, New Jersey: 1) to investigate the nature and extent of contamination within the Bound Brook downstream of the Cornell-Dubilier site; 2) to conduct an ecological risk assessment of a portion of the Bound Brook and its associated floodplain downstream of the Cornell-Dubilier site, according to the Ecological Risk Assessment Guidance for Superfund (U.S. EPA 1997a); and 3) to present data from the analysis of fish fillets collected from the Bound Brook downstream of the Cornell-Dubilier site for the purposes of assessment of risk to human health.

The Cornell-Dubilier Electronics Site is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey (Figure 1). The site occupies approximately 25 acres in an industrial, commercial, and residential area. During its years of operation at the site (1936 to 1962), Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, including capacitors. It is alleged that during their operations, Cornell-Dubilier Electronics, Inc. dumped polychlorinated biphenyl (PCB) contaminated materials and other hazardous substances directly onto site soils. Through the years, dozens of companies have operated at the site as tenants. The site is currently known as the Hamilton Industrial Park and is occupied by an estimated 15 commercial businesses (U.S. EPA 1997b).

The Bound Brook traverses the southeast corner of the site property, and stream width varies from 10 to 20 feet across the site, with a varying depth of approximately 1 to 4 feet. The Bound Brook then flows northwest for approximately 0.5 miles before joining with the Cedar Brook (which drains Spring Lake to the northeast). The Bound Brook flows approximately 0.75 miles before emptying into the east end of New Market Pond. At the west end of New Market Pond, water flows over a spillway and continues west as the Bound Brook for approximately 4 miles before joining with the Green Brook. The Green Brook continues southwest for another 3 miles before flowing into the Raritan River. All of the above-mentioned water bodies are designated by the State of New Jersey for the maintenance, migration, and propagation of the natural and established biota. There are no surface water intakes along this flow path for at least 15 miles. However, these water bodies are reportedly utilized as freshwater fisheries (U.S. EPA 1997b). In addition, there are approximately 34 acres of wetlands within 0.5 miles of the site (U.S. EPA 1997b). Wetlands that border the site to the southeast diminish significantly as the creek heads downstream toward the northwest.

A preliminary investigation (Phase I) was conducted between 28 and 30 May 1997 to determine the downstream extent of PCBs and metals in the sediment and floodplain soils using screening methods. This data was utilized to select sampling locations between the site and New Market Pond (Phase II). Phase II was conducted on 16 through 20 and 27 June 1997. Samples collected for Phase II included surface water, sediment, soil, small mammals, crayfish, forage fish, and edible fish (fillets). Phase II sampling was conducted at a total of seven locations within the Bound Brook for the aquatic samples and at three locations adjacent to the Bound Brook for the terrestrial samples. In addition, an aquatic reference area was selected in the Bound Brook upstream of the site, and a terrestrial reference area was selected adjacent to the Cedar Brook between Spring Lake and the Cedar Brook's confluence with the Bound Brook.

For Phase II, all surface water, sediment, and soil samples were analyzed for PCBs, pesticides, target analyte list (TAL) metals, volatile organic compounds (VOCs), and base-, neutral-, and acid-extractable compounds (BNAs). In addition, soil and sediment samples were analyzed for grain size and total organic carbon (TOC). Sediment samples were also analyzed for total petroleum hydrocarbons, and ammonia, and they were evaluated in a 14-day toxicity test using the amphipod, *Hyaella azteca*. All crayfish samples were analyzed for BNAs, TAL metals, pesticides, and PCBs. All fish samples were analyzed for TAL metals, pesticides, and PCBs. All small mammal samples were analyzed for pesticides and PCBs. In addition, livers and kidneys from the small mammals were submitted for histopathological evaluation. The resulting data were used to support an ecological risk assessment, an extent of contamination evaluation, and a presentation of data for the purposes a human health risk assessment, which was performed separately by U.S. EPA's Region II office.

Preliminary data from Phase II indicated that PCBs, as well as other contaminants, were detected in fish collected as far downstream as New Market Pond. Therefore, an additional round of sampling (Phase III) was conducted on 7 August 1997 to evaluate the downstream extent of contamination in the Bound Brook. Only edible fish tissue and sediments were collected during Phase III. These samples were collected from three locations within the Bound Brook between New Market Pond and the confluence with the Green Brook, and from one location in the Green Brook just upstream of its confluence with the Raritan River.

The nature and extent of contamination evaluation revealed the following:

- ◆ Many contaminants are present at relatively high levels adjacent to and/or immediately down gradient of the site. These concentrations progressively decrease toward location A14, near the confluence of the Green Brook and the Raritan River, with the exception of a sharp increase either immediately upstream of New Market Pond or within New Market Pond. The increase in concentrations of many contaminants immediately upstream or within New Market Pond may be the result of a slower rate of flow, resulting in greater deposition of particles onto which the contaminants are adsorbed. Regardless, the high concentrations adjacent to and directly downstream of the Cornell-Dubilier Electronics site indicates that the site is the primary source of many of the contaminants of concern within the section of the Bound Brook corridor investigated for this study.
- ◆ The presence of contaminants up gradient of the site (at the reference and in Spring Lake) suggest that, in addition to the Cornell-Dubilier Electronics site, other sources of contamination exist within the Bound Brook stream corridor.

The results of the ecological risk assessment resulted in the following overall conclusions:

- ◆ The structure and function of the Bound Brook and its stream corridor adjacent to and downstream of the Cornell-Dubilier Electronics site is at risk from chemical contamination. First, a risk is posed to the benthic community and is potentially due to a variety of VOCs and BNAs, silver, calcium, copper, vanadium, zinc, and dieldrin. The fish within the stream were determined to be at risk from exposure to selenium, but the risk posed to fish by the other bioaccumulative COPCs could not be determined. Birds utilizing the stream were determined to be at risk from lead, PCBs, total endrin, total chlordane, and total DDT. A risk to omnivorous mammals using the stream was found to be posed by methoxychlor, arsenic, mercury, PCBs and selenium. Finally, a risk to carnivorous mammals was also found to be posed by PCBs.
- ◆ Of the contaminants determined to pose a risk to the assessment endpoints evaluated in the risk assessment, the most significant risk is posed by those contaminants which resulted in a hazard quotient greater than one using the mean contaminant concentrations and the LOAEL in the food chain models. This occurred for PCBs using the omnivorous mammal and piscivorous bird models and for selenium using the omnivorous mammal model. However, for these two contaminants, a preliminary ecotoxicologically-based sediment remedial goal could not be determined because their sediment concentrations did not correlate with their resulting hazard quotients in the food chain models. In addition, it is probable that other sources, in addition to the Cornell-Dubilier site, exist and are contributing to the risk posed by these two contaminants. Therefore, source control at the Cornell-Dubilier site is recommended at a minimum in order to decrease risk to the assessment endpoints evaluated in the risk assessment.

The main points elucidated from the data for the human health risk assessment are as follows:

- ◆ In general, the highest PCB and pesticide concentrations were found in the carp, followed by white sucker, pumpkin seed, and largemouth bass. The concentrations of these compounds may be linked to the percent lipids in each of these species.
- ◆ With the exception of carp, the highest PCB concentrations were noted in the fish collected in the Bound Brook from the reference area downstream to New Market Pond. The concentration of PCBs were higher in carp collected downstream of New Market Pond. This is most likely due to the large size (and therefore age) of the carp collected below New Market Pond and the limited number of carp collected, resulting in high variability in the data.
- ◆ Of particular note is the presence of PCBs and many pesticides in the fish collected from Spring Lake. Since this lake receives water from a different drainage, it appears as if another source, in addition to the Cornell-Dubilier Electronics site, may be contributing to the contamination within the Bound Brook. Nevertheless, the Cornell-Dubilier Electronics site appears to be a significant source of PCBs detected in the edible fish tissue collected from the Bound Brook downstream of the site.

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Next meeting ~ 6/26

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